Drinking Water Surveillance Program

SUDBURY (WANAPITEI) WATER SUPPLY SYSTEM

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DRINKING WATER SURVEILLANCE PROGRAM

ANNUAL REPORT 1988

FEBRUARY 1990

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EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

SUDBURY (WANAPITEI) WATER SUPPLY
1988 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 52 plants are being monitored.

The Sudbury (Wanapitei) Water Treatment Plant is a direct filtration plant that treats water from the Wanapitei River. The treatment process consists of coagulation, flocculation, filtration, disinfection and fluoridation. This plant has a design capacity of 37 x 1000 m^3/day and along with the David Street Water Treatment Plant serves a population of 95,000.

Samples from two distribution system sites were taken seven times in 1988 and analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical(Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Pesticides and PCB and Volatiles).

A summary of results is shown in Table 1.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

During 1988 the limited DWSP sampling results indicated that the distributed supply from the Sudbury (Wanapitei) Water Treatment Plant was of good quality.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS)

SUMMARY TABLE BY SCAN

SCAN	SITE 1 TESTS	SITE 1 POSITIVE	SITE 1 %POSITIVE	SITE 2 TESTS	SITE 2 POSITIVE	SITE 2 %POSITIVE
BACTERIOLOGICAL	14	2	14	15	1	6
CHEMISTRY (FLD)	20	20	100	40	40	100
CHEMISTRY (LAB)	167	140	83	200	163	81
METALS	235	105	44	259	116	44
CHLOROAROMATICS	70	0	0	84	0	0
PESTICIDES & PCB	160	0	0	194	0	0
SPECIFIC PESTICIDES	0	0	0	0	0	0
VOLATILES	82	7	8	110	9	8
TOTAL	748	274		902	329	

NO HEALTH RELATED GUIDELINES WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

DRINKING WATER SURVEILLANCE PROGRAM

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INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 52 plants are being monitored.

The DWSP was initiated at the Sudbury (Wanapitei) Water Treatment Plant in April of 1987. An Annual Report was published for 1987 (ISBN 0840-5220).

PLANT DESCRIPTION

The Sudbury (Wanapitei) Water Treatment Plant is a direct filtration plant which treats water from the Wanapitei River. The process consists of coagulation, flocculation, filtration, disinfection, fluoridation and post pH adjustment. Polyelectrolyte is added as a coagulant aid. Chlorine dioxide is used for post disinfection and calcium hydroxide for post pH adjustment. The plant has a design capacity of 37 x 1000 m^3/day and sample day flows ranging from 16.4 x 1000 m^3/day to 30 x 1000 m^3/day. The plant is currently being expanded to double its capacity.

This plant along with the David Street Water Treatment Plant serves a population of approximately 95,000.

The plant location is shown in Figure 1. General plant information is presented in Table 2.

METHODS

No samples of the raw and treated water at the treatment plant were obtained because sampling lines meeting the DWSP requirements were not installed. Water samples from the distribution system were obtained from two DWSP approved locations;

i) Distribution System - Site 1 - This house is approximately 2.7 kilometers from the plant. Water was sampled through a copper sample line at the basement laundry tap.

ii) Distribution System - Site 2 - This house is approximately 5.8 kilometers from the plant. Water was sampled through a copper sample line at the basement laundry tap.

At the distribution system locations two types of samples were obtained: a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples are used to make an assessment of the amount by which the levels of

inorganic compounds and metals may be changed on standing due to leaching from (or deposition on) the plumbing system. The only analyses carried out on the standing samples therefore, are General Chemistry and Metals. The free flow sample represented fresh water from the distribution main that had been flowing at the sample tap for five minutes before the sample was taken.

Stringent DWSP sampling protocols were followed ensure that all samples were taken in a uniform manner.

Sample day flow, treatment chemical dosages and Field Chemistry measurements such as Turbidity, Chlorine Residuals, pH and Temperature were recorded on the day of sampling and were entered on the DWSP data base as submitted.

RESULTS

The Sudbury (Wanapitei) Water Supply Sysytem was sampled for approximately 160 parameters on a monthly basis. As a result of an unforeseen emergency the laboratory capacity was exceeded and analysis for volatiles could not be carried out when the samples were received. Since analysis for volatiles is no longer valid after four weeks of storage, volatile results for January or February are not available. At the request of the municipality all sampling was discontinued in August.

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM

SITE LOCATION MAP

SUDBURY WATER SUPPLY SYSTEM

TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

SUDBURY (WANAPITEI) WATER SUPPLY SYSTEM

LOCATION:	HIGHWAY 17 EAST CONISTON, ONTARIO (705-694-5358)
SOURCE:	RAW WATER SOURCE - WANAPITEI RIVER
RATED CAPACITY:	27.0 (1000 M^3/DAY)
OPERATION:	MUNICIPALITY
PLANT SUPERINTENDENT:	J. KRIEG
MINISTRY REGION:	NORTHEAST
DISTRICT OFFICER:	J.G. ROBERTSON

MUNICIPALITY SERVED	POPULATION
WANAPITEI	2,500
CONISTON	2,500
SUDBURY	90,453

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples analysed for by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment (MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 lists all parameters analysed in the DWSP.

Associated guidelines and detection limits are also supplied on both tables. Parameters are listed alphabetically within each scan.

DISCUSSION

General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWOs) as defined in the 1984 publication (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters, these are are currently under review. When an ODWO is not available guidelines/limits from other agencies are consulted. The Parameters Listing System (PALIS) recently published (ISBN 0-7729-4461-X) by the MOE catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

Although some of the parameters measured on DWSP may be present in the raw and treated water as a result of pollution, many of the compounds detected are naturally occuring or are treatment by-products.

Plant operational personnel address occurrences of taste and odour or biological water quality parameters. The DWSP does not assess these aspects of the water supply.

As stated under Results, traces do not indicate quantifiable values, as defined by established MOE Laboratory analytical reporting protocols. While they can be useful in trend analysis or confirmation of the presence of a specific contaminant that is

repeatedly detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant. **DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CONDUCTED ON POSITIVE RESULTS.**

Bacteriology

Positive results for the Bacteriology scan were present twice in the distribution system Site 1 water and once in the Site 2 water. The positive parameters were all Standard Plate Count.

Standard Plate Count is a test used to supplement routine analysis for Coliform bacteria. The limit for Standard Plate Count (at 35°C after 48 hours) in the ODWOs is 500 organisms per mL (based on a geometric mean of 5 or more samples).

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality; the routine monitoring program usually requires the taking of multiple samples in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples. Further, bacteriological limits were developed in acknowledgement that the presence of coliforms may be detected due to their non-uniform distribution throughout the distribution system and the fact that their enumeration is subject to considerable variation. Routine bacteriological monitoring, as

outlined in the ODWOs is carried out by the operating authority.

Inorganic and Physical Parameters

Laboratory and Field Chemistry

The results for Laboratory Chemistry and Field Chemistry scans were below applicable health related ODWOs.

Colour values exceeded the aesthetic ODWO of 5 True Colour Units (TCU) in two of the Site 1 waters and one Site 2 water. Colour in drinking water may be due to the presence of natural or synthetic organic substances as well as certain metallic ions.

It is desirable that the Temperature of drinking water be less than 15°C; the palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The temperature of the delivered water may increase in the distribution system due to the warming effect of the soil in late summer and fall and/or as a result of higher temperatures in the source water. The desired ODWO was exceeded once at each location. At Site 2 the exceedence occurred in January and may indicated that the water was not allowed to flow for a long enough period before the free flow sample was taken.

The Langelier Index is used extensively in estimating the corrosion

potential of water. An increasingly negative index indicates the increasing possibility of corrosion. It is considered sound engineering practice to maintain a slightly positive Langelier Index. The Langelier Index for the Sudbury (Wanapitei) Supply is consistently negative. The negative Langelier Index combined with the low alkalinity and softness of the water shows a tendency to corrode.

As part of the treatment plant process Sodium Silicofluoride is added to the treated water (Table 3). Where fluoridation is practised, the Fluoride concentration recommended in the ODWO is 1.2 mg/L, plus or minus 0.2 mg/L. This level was not maintained in May or July. Dosage values reported in Table 3 indicate that the plant on occasion is underdosing.

Metals

The results reported for the Metal scan were below any applicable health related ODWOs.

Elevated levels of Copper, Lead and Zinc were generally detected in the standing samples as compared to the free flow distribution samples, indicating that small quantities of these metals were leached from the household plumbing as the water stood overnight. The amount of leaching which occurred at the two distribution sites was not excessive and may indicate that the pH correction is controlling the corrosivity of the water to some extent.

The European Economic Community's Maximum Admissable Concentration for Nickel in drinking water of .05 mg/L was exceeded in the February Site 2 sample. However this particular sample shows erratic results for the general chemistry parameters (alkalinity, Conductivity) and metals (strontium, manganese) indicating a different source of the water. Due to changes in the distribution system flow patterns the water is probably supplied from the David Street Water Treatment Plant.

Organic

Chloroaromatics

The results of the Chloroaromatics group showed that no chloroaromatics were detected.

Pesticides and PCB (Polychlorinated Biphenyl)

Within the Pesticides and PCB scan no PCBs were detected and two pesticides were detected:

Alpha BHC

Lindane

There are several isomers of BHC (Benzene Hexachloride); gamma BHC is the active ingredient in the pesticide Lindane, while alpha BHC is the isomer most predominantly found in surface waters of the Great Lakes basin as indicated in results from other water supplies

on DWSP.

Alpha BHC was detected at trace levels, three times in the Site 1 water and six times in the Site 2 water.

Lindane was detected at a trace level, once in the Site 1 water.

Volatiles

Within the Volatile scan five parameters, other than Trihalomethanes(THMs), were detected:

Benzene

Toluene

Ethylbenzene

M-Xylene

O-Xylene

Benzene was detected at trace levels, once in the Site 1 water and twice in the Site 2 water.

Toluene was detected at trace levels, twice in the Site 1 water and twice in the Site 2 water. The detection of toluene at low, trace levels is a laboratory artifact derived from the analytical methodology. The purge-and-trap analytical technique depends on the purging of the volatile organics in the water sample with helium gas onto a Tenax trapping column. The volatile materials are subsequently thermally desorbed, separated and quantified. Tenax,

a toluene-like polymeric material, tends to decompose sporadically upon heating into toluene and other aromatic componenets (ethylbenzene and xylene) giving instrument blanks in the order of 0.05 ug/L.

Ethylbenzene was detected at a trace level, once in the Site 1 water and once in the Site 2 water.

Meta-Xylene (M-Xylene) was detected at a trace level, once in the Site 1 water.

Ortho-Xylene (O-Xylene) was detected at a trace level, in the Site 1 water.

These volatiles are typically found on an occasional basis at other water supplies included on the DWSP, usually at trace levels.

THMs are acknowledged to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised of Chloroform, Chlorodibromomethane and Dichlorobromomethane with Bromoform occurring occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Dichlorobromomethane and Total THMs were detected in all distributed waters. A marked increase in Total THMs occurred

in July; this corresponds to an increase in the post-chlorination dosage (Table 3). All Total THM occurrences, ranging from 27.6 ug/L to 96.8 ug/L, were below the ODWO of 350 ug/L.

CONCLUSIONS

The limited program completed at the Sudbury (Wanapitei) Water Supply for the sample year of 1988, indicated good quality water in the distribution system.

No health related guidelines for organic or inorganic parameters, were exceeded during 1988.

RECOMMENDATIONS

Two recommendations can be made:

1) To fully assess water quality at this supply
   a) the plant should retrofit their sampling lines to meet with the DWSP requirements so that the plant raw and treated water can be evaluated
   b) sampling in the distribution system should be continued.

2) The fluoridation may require modification to ensure that the recommended level is maintained.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) SAMPLE DAY CONDITIONS FOR 1988

	SAMPLE DAY CONDITIONS		TREATMENT CHEMICAL DOSAGES (MG/L)						
			PRE-CHLORINATION	COAGULATION	COAGULATION AID	TASTE & ODOUR	FLUORIDATION	POST PH ADJUSTMENT	POST-CHLORINATION
			CHLORINE	ALUM LIQUID	POLYELECTROLYTE	SODIUM CHLORITE	SODIUM SILICOFLUORIDE	CALCIUM HYDROXIDE	CHLORINE
DATE	RETENTION TIME(HRS)	FLOW (1000 M3)							
JAN 26	.	21.6	00.85	24.20	00.24	00.20	01.20	16.21	00.51
FEB 25	.	16.4	01.14	22.20	00.25	00.32	01.14	15.60	00.51
MAR 29	.	.	00.66	19.22	00.54	00.30	01.07	14.60	00.20
APR 26	.	24.5	01.14	23.20	00.30	00.30	01.07	08.11	00.46
MAY 24	.	28.0	01.32	23.20	00.25	00.30	01.07	08.61	00.38
JUN 28	.	28.2	01.51	27.22	00.25	00.30	00.94	08.61	00.51
JUL 19	.	30.3	00.72	25.21	00.69	00.30	00.72	10.59	02.27

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1 TOTAL	SITE 1 POSITIVE	SITE 1 TRACE	SITE 2 TOTAL	SITE 2 POSITIVE	SITE 2 TRACE
BACTERIOLOGICAL	STANDRD PLATE CNT MF	2	2	0	2	1	0
	P/A BOTTLE	4	0	0	5	0	0
	TOTAL COLIFORM MF	4	0	0	4	0	0
	T COLIFORM BCKGRD MF	4	0	0	4	0	0
*TOTAL SCAN BACTERIOLOGICAL		14	2	0	15	1	0
*TOTAL GROUP BACTERIOLOGICAL		14	2	0	15	1	0
CHEMISTRY (FLD)	FLD CHLORINE (COMB)	.	.	.	1	1	0
	FLD CHLORINE FREE	.	.	.	8	8	0
	FLD CHLORINE (TOTAL)	.	.	.	9	9	0
	FLD PH	10	10	0	10	10	0
	FLD TEMPERATURE	10	10	0	12	12	0
*TOTAL SCAN CHEMISTRY (FLD)		20	20	0	40	40	0
CHEMISTRY (LAB)	ALKALINITY	10	10	0	12	12	0
	CALCIUM	10	10	0	12	12	0
	CYANIDE	5	0	0	6	0	0
	CHLORIDE	10	10	0	12	12	0
	COLOUR	10	10	0	12	6	6
	CONDUCTIVITY	10	10	0	12	12	0
	FLUORIDE	10	10	0	12	12	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1 TOTAL	SITE 1 POSITIVE	SITE 1 TRACE	SITE 2 TOTAL	SITE 2 POSITIVE	SITE 2 TRACE
CHEMISTRY (LAB)	HARDNESS	10	10	0	12	12	0
	IONCAL	10	0	0	12	2	0
	LANGELIER'S INDEX	2	2	0	0	0	0
	MAGNESIUM	10	10	0	12	12	0
	SODIUM	10	10	0	12	12	0
	AMMONIUM TOTAL	10	9	1	12	10	2
	NITRITE	10	1	9	12	0	12
	TOTAL NITRATES	10	10	0	12	12	0
	NITROGEN TOT KJELD	10	8	2	12	11	1
	PH	10	10	0	12	12	0
	SULPHATE	.	.	.	2	2	0
	TURBIDITY	10	10	0	12	12	0
*TOTAL SCAN CHEMISTRY (LAB)		167	140	12	200	163	21
METALS	SILVER	10	1	6	11	0	4
	ALUMINUM	10	10	0	11	11	0
	ARSENIC	10	0	10	11	0	11
	BARIUM	10	10	0	11	11	0
	BORON	10	0	10	11	1	10
	BERYLLIUM	10	1	3	11	0	6
	CADMIUM	10	0	4	11	0	8
	COBALT	10	1	9	11	0	11
	CHROMIUM	10	0	8	11	0	11

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1 TOTAL	SITE 1 POSITIVE	SITE 1 TRACE	SITE 2 TOTAL	SITE 2 POSITIVE	SITE 2 TRACE
METALS	COPPER	10	10	0	11	11	0
	IRON	10	10	0	11	6	5
	MERCURY	5	2	0	6	4	2
	MANGANESE	10	10	0	11	11	0
	MOLYBDENUM	10	0	10	11	0	11
	NICKEL	10	10	0	11	11	0
	LEAD	10	8	2	11	11	0
	ANTIMONY	10	0	9	11	2	9
	SELENIUM	10	0	7	11	0	7
	STRONTIUM	10	10	0	11	11	0
	TITANIUM	10	10	0	11	11	0
	THALLIUM	10	0	3	11	0	4
	URANIUM	10	0	6	11	0	8
	VANADIUM	10	2	8	11	4	7
	ZINC	10	10	0	11	11	0
*TOTAL SCAN METALS		235	105	95	259	116	114
*TOTAL GROUP INORGANIC & PHYSICAL		422	265	107	499	319	135
CHLOROAROMATICS	HEXACHLOROBUTADIENE	5	0	0	6	0	0
	123 TRICHLOROBENZENE	5	0	0	6	0	0
	1234 T-CHLOROBENZENE	5	0	0	6	0	0
	1235 T-CHLOROBENZENE	5	0	0	6	0	0
	124 TRICHLOROBENZENE	5	0	0	6	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1 TOTAL	SITE 1 POSITIVE	SITE 1 TRACE	SITE 2 TOTAL	SITE 2 POSITIVE	SITE 2 TRACE
CHLOROAROMATICS	1245 T-CHLOROBENZENE	5	0	0	6	0	0
	135 TRICHLOROBENZENE	5	0	0	6	0	0
	HCB	5	0	0	6	0	0
	HEXACHLOROETHANE	5	0	0	6	0	0
	OCTACHLOROSTYRENE	5	0	0	6	0	0
	PENTACHLOROBENZENE	5	0	0	6	0	0
	236 TRICHLOROTOLUENE	5	0	0	6	0	0
	245 TRICHLOROTOLUENE	5	0	0	6	0	0
	26A TRICHLOROTOLUENE	5	0	0	6	0	0
*TOTAL SCAN CHLOROAROMATICS		70	0	0	84	0	0
PESTICIDES & PCB	ALDRIN	5	0	0	6	0	0
	ALPHA BHC	5	0	3	6	0	6
	BETA BHC	5	0	0	6	0	0
	LINDANE	5	0	1	6	0	0
	ALPHA CHLORDANE	5	0	0	6	0	0
	GAMMA CHLORDANE	5	0	0	6	0	0
	DIELDRIN	5	0	0	6	0	0
	METHOXYCHLOR	5	0	0	6	0	0
	ENDOSULFAN I	5	0	0	6	0	0
	ENDOSULFAN II	5	0	0	6	0	0
	ENDRIN	5	0	0	6	0	0
	ENDOSULFAN SULPHATE	5	0	0	6	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1 TOTAL	SITE 1 POSITIVE	SITE 1 TRACE	SITE 2 TOTAL	SITE 2 POSITIVE	SITE 2 TRACE
PESTICIDES & PCB	HEPTACHLOR EPOXIDE	5	0	0	6	0	0
	HEPTACHLOR	5	0	0	6	0	0
	MIREX	5	0	0	6	0	0
	OXYCHLORDANE	5	0	0	6	0	0
	OPDDT	5	0	0	6	0	0
	PCB	5	0	0	6	0	0
	DDD	5	0	0	6	0	0
	PPDDE	5	0	0	6	0	0
	PPDDT	5	0	0	6	0	0
	AMETRINE	5	0	0	6	0	0
	ATRAZINE	5	0	0	6	0	0
	ATRATONE	5	0	0	6	0	0
	CYANAZINE	5	0	0	6	0	0
	DES ETHYL ATRAZINE	.	.	.	1	0	0
	DES ETHYL SIMAZINE	.	.	.	1	0	0
	PROMETONE	5	0	0	6	0	0
	PROPAZINE	5	0	0	6	0	0
	PROMETRYNE	5	0	0	6	0	0
	METRIBUZIN	5	0	0	6	0	0
	SIMAZINE	5	0	0	6	0	0
	ALACHLOR	5	0	0	6	0	0
	METOLACHLOR	5	0	0	6	0	0
*TOTAL SCAN PESTICIDES & PCB		160	0	4	194	0	6

TABLE 4

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SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1 TOTAL	SITE 1 POSITIVE	SITE 1 TRACE	SITE 2 TOTAL	SITE 2 POSITIVE	SITE 2 TRACE
SPECIFIC PESTICIDES	TOXAPHENE	0	0	0	0	0	0
*TOTAL SCAN SPECIFIC PESTICIDES		0	0	0	0	0	0
VOLATILES	BENZENE	3	0	1	4	0	2
	TOLUENE	3	1	1	4	0	2
	ETHYLBENZENE	3	0	1	4	0	1
	P-XYLENE	2	0	0	4	0	0
	M-XYLENE	3	0	1	4	0	0
	O-XYLENE	3	0	1	4	0	0
	1,1 DICHLOROETHYLENE	3	0	0	4	0	0
	METHYLENE CHLORIDE	3	0	0	4	0	0
	T1,2DICHLOROETHYLENE	3	0	0	4	0	0
	1,1 DICHLOROETHANE	3	0	0	4	0	0
	CHLOROFORM	2	2	0	3	3	0
	111, TRICHLOROETHANE	3	0	0	4	0	0
	1,2 DICHLOROETHANE	3	0	0	4	0	0
	CARBON TETRACHLORIDE	3	0	0	3	0	0
	1,2 DICHLOROPROPANE	3	0	0	4	0	0
	TRICHLOROETHYLENE	3	0	0	4	0	0
	DICHLOROBROMOMETHANE	2	2	0	3	3	0
	112 TRICHLOROETHANE	3	0	0	4	0	0
	CHLORODIBROMOMETHANE	3	0	0	4	0	0
	T-CHLOROETHYLENE	3	0	0	4	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1 TOTAL	SITE 1 POSITIVE	SITE 1 TRACE	SITE 2 TOTAL	SITE 2 POSITIVE	SITE 2 TRACE
VOLATILES	BROMOFORM	3	0	0	4	0	0
	1122 T-CHLOROETHANE	3	0	0	4	0	0
	CHLOROBENZENE	3	0	0	4	0	0
	1,4 DICHLOROBENZENE	3	0	0	4	0	0
	1,3 DICHLOROBENZENE	3	0	0	4	0	0
	1,2 DICHLOROBENZENE	3	0	0	4	0	0
	TRIFLUOROCHLOROTOLUE	2	0	0	2	0	0
	ETHLYENE DIBROMIDE	3	0	0	4	0	0
	TOTL TRIHALOMETHANES	2	2	0	3	3	0
*TOTAL SCAN VOLATILES		82	7	5	110	9	5
*TOTAL GROUP ORGANIC		312	7	9	388	9	11
TOTAL		748	274	116	902	329	146

KEY TO TABLE 5 and 6

A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
1+. MAC for Total Trihalomethanes
1*. MAC for Bacteriological Analyses
Poor water quality is indicated when :
- total coliform counts > 0 < 5
- P/A Bottle Test is present after 48 hours
- Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
- Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
- Standard Plate Count should not exceed 500 organisms per ml at 35 ^{0}C within 48 hours

2. Interim Maximum Acceptable Concentration (IMAC)
3. Maximum Desirable Concentration (MDC)
4. Aesthetic or Recommended Operational Guideline
- hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness >200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.

B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC
4. Aesthetic Objective (AO) (for xylenes, the AO is a total)

C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria

F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissable Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

H USSR MAXIMUM PERMISSIBLE CONCENTRATION

I NEW YORK STATE AMBIENT WATER GUIDELINE

N/A NONE AVAILABLE

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurable Amount
<T	Greater Than Detection Limit But Not Confident
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!AW	No Data: Analysis Withdrawn
!CR	No Data: Could Not Confirm By Reanalysis
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!LA	No Data: Laboratory Accident
!LD	No Data: Test Queued After Sample Discarded
!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!PE	No Data: Procedural Error - Sample Discarded
!PH	No Data: Sample pH Outside Valid Range
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
!TX	No Data: Time Expired
A3C	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRO	Calculated Result Only
PPS	Test Performed On Preserved Sample

RMP	P and M-Xylene Not Separated
RRV	Rerun Verification
RVU	Reported Value Unusual
SPS	Several Peaks, Small, Not Priority Pollutant
UAL	Unreliable: Sample Age Exceeds Normal Limit
UCR	Unreliable: Could Not Confirm By Reanalysis
UCS	Unreliable: Contamination Suspected
UIN	Unreliable: Indeterminant Interference
XP	Positive After X Number of Hours

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT				DISTRIBUTION SYSTEM
	SITE 1		SITE 2		
	STANDING	FREE FLOW	STANDING	FREE FLOW	
BACTERIOLOGICAL					
STANDRD PLATE CNT MF (CT/ML)		DET'N LIMIT = 0			GUIDELINE = 500/ML (A1)
FEB	.	2	.		2
MAR	.	!AW	.		!AW
APR	.	.	.		0
MAY	.	43	.		.
JUN	.	!AW	.		!AW
JUL	.	.	.		!LA
P/A BOTTLE (0=ABSENT)		DET'N LIMIT = 0			GUIDELINE = 0 (A1*)
FEB	.	0	.		0
MAR	.	0	.		0
APR	.	.	.		0
MAY	.	0	.		.
JUN	.	0	.		0
JUL	.	.	.		0
TOTAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0			GUIDELINE = 5/100ML(A1)
FEB	.	0	.		0
MAR	.	0	.		0
APR	.	.	.		0
MAY	.	0	.		.
JUN	.	0	.		0
JUL	.	.	.		!LA
T COLIFORM BCKGRD MF (CT/100ML)		DET'N LIMIT = 0			GUIDELINE = N/A
FEB	.	0	.		0
MAR	.	0	.		0
APR	.	.	.		0
MAY	.	0	.		.
JUN	.	0	.		0
JUL	.	.	.		!LA

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
CHEMISTRY (FLD)				
FLD CHLORINE (COMB) (MG/L)		DET'N LIMIT = N/A		GUIDELINE = N/A
FEB	.	.	.100	.
FLD CHLORINE FREE (MG/L)		DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	.	.	.100	.100
FEB	.	.	.100	.100
MAR	.	.	.100	.100
APR	.	.	.100	.100
FLD CHLORINE (TOTAL) (MG/L)		DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	.	.	.100	.100
FEB	.	.	.200	.100
MAR	.	.	.100	.100
APR	.	.	.100	.100
JUN	.	.	.	.100
FLD PH (DMSNLESS)		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5(A4)
JAN	7.200	7.700	.	.
FEB	7.800	8.000	7.000	7.200
MAR	7.200	7.100	7.000	7.200
APR	.	.	7.000	7.000
MAY	7.700	7.900	.	.
JUN	7.100	7.400	7.400	7.000
JUL	.	.	7.600	8.000
FLD TEMPERATURE (DEG.C)		DET'N LIMIT = N/A		GUIDELINE = 15 (A1)
JAN	21.000	4.000	19.000	16.000
FEB	2.000	3.000	20.500	10.000
MAR	16.000	3.000	20.000	6.000
APR	.	.	20.000	6.000
MAY	18.300	10.000	.	.
JUN	12.000	16.000	20.000	13.000
JUL	.	.	23.000	14.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
CHEMISTRY (LAB)				
ALKALINITY (MG/L)		DET'N LIMIT = .200		GUIDELINE = 30-500 (A4)
JAN	19.400	20.600	20.000	21.000
FEB	22.200	22.100	28.100	30.400
MAR	18.500	18.600	19.100	18.700
APR	.	.	18.400	19.900
MAY	20.300	19.600	.	.
JUN	19.200	19.500	19.600	19.700
JUL	.	.	23.700	23.100
CALCIUM (MG/L)		DET'N LIMIT = .100		GUIDELINE = 100 (F2)
JAN	16.600	16.800	16.600	18.000
FEB	15.600	15.400	17.200	18.200
MAR	13.000	14.400	14.800	15.000
APR	.	.	15.000	14.400
MAY	15.200	14.400	.	.
JUN	17.200	17.000	17.200	18.200
JUL	.	.	18.800	18.600
CHLORIDE (MG/L)		DET'N LIMIT = .200		GUIDELINE = 250 (A3)
JAN	2.000	1.900	2.000	1.800
FEB	3.100	2.600	39.500	46.200
MAR	2.500	2.400	2.500	2.300
APR	.	.	2.400	2.100
MAY	2.100	2.100	.	.
JUN	2.600	2.500	2.600	2.700
JUL	.	.	2.600	2.700
COLOUR (TCU)		DET'N LIMIT = .5		GUIDELINE = 5.0 (A3)
JAN	4.000	2.500	1.000 <T	1.500 <T
FEB	3.500	2.500	6.500	7.000
MAR	5.500	3.000	1.500 <T	3.000
APR	.	.	2.000 <T	2.500
MAY	9.500	7.000	.	.
JUN	9.000	6.500	1.500 <T	3.000
JUL	.	.	1.500 <T	2.500
CONDUCTIVITY (UMHO/CM)		DET'N LIMIT = 1		GUIDELINE = 400 (F2)
JAN	124	123	120	123
FEB	128	121	268	293
MAR	114	113	120	114

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
APR	.	.	117	117
MAY	117	114	.	.
JUN	123	123	125	125
JUL	.	.	132	133
FLUORIDE (MG/L)		DET'N LIMIT = .01		GUIDELINE = 2.400 (A1)
JAN	1.100	1.140	1.200	1.120
FEB	1.280	1.210	1.180	1.230
MAR	1.120	1.090	1.180	1.070
APR	.	.	1.070	1.060
MAY	.920	.930	.	.
JUN	1.010	1.080	.990	1.110
JUL	.	.	.720	.790
HARDNESS (MG/L)		DET'N LIMIT = .500		GUIDELINE = 80-100 (A4)
JAN	50.000	50.000	50.000	53.000
FEB	51.000	50.000	59.000	62.000
MAR	42.000	47.000	48.000	49.000
APR	.	.	48.000	45.000
MAY	46.000	43.000	.	.
JUN	52.000	51.000	53.000	54.000
JUL	.	.	56.000	55.000
IONCAL (DIMSNLESS)		DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	.000 NAF	.000 NAF	.000 NAF	.000 NAF
FEB	.000 NAF	.000 NAF	.000 NAF	.000 NAF
MAR	.000 NAF	.000 NAF	.000 NAF	.000 NAF
APR	.	.	.000 NAF	.000 NAF
MAY	.000 NAF	.000 NAF	.	.
JUN	.000 NAF	.000 NAF	.000 NAF	.000 NAF
JUL	.	.	1.493	1.523
LANGELIERS INDEX (DIMSNLESS)		DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	-1.521 NAF	-1.329 NAF	-1.466 NAF	-1.281 NAF
FEB	-1.211 NAF	-1.165 NAF	-1.202 NAF	-1.003 NAF
MAR	-1.523 NAF	-1.485 NAF	-1.455 NAF	-1.416 NAF
APR	.	.	-1.394 NAF	-1.218 NAF
MAY	1.166 NAF	1.173 NAF	.	.
JUN	-1.319 NAF	-1.237 NAF	-1.261 NAF	-1.194 NAF
JUL	.	.	-1.143	-.879

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
MAGNESIUM (MG/L)		DET'N LIMIT = .050		GUIDELINE = 30 (F2)
JAN	2.000	2.000	2.000	2.000
FEB	2.800	2.800	4.000	4.100
MAR	2.400	2.700	2.700	2.800
APR	.	.	2.400	2.300
MAY	2.000	1.700	.	.
JUN	2.300	2.200	2.300	2.200
JUL	.	.	2.200	2.100
SODIUM (MG/L)		DET'N LIMIT = .200		GUIDELINE = 200 (C3)
JAN	1.600	1.400	1.400	1.400
FEB	2.000	1.800	21.600	26.600
MAR	1.600	1.600	2.000	1.400
APR	.	.	1.600	1.800
MAY	1.600	1.400	.	.
JUN	1.800	1.800	1.600	1.600
JUL	.	.	1.400	1.200
AMMONIUM TOTAL (MG/L)		DET'N LIMIT = 0.002		GUIDELINE = .05 (F2)
JAN	.252	.016	.126	.012
FEB	.114	.008 <T	.028	.006 <T
MAR	.046	.020	.116	.016
APR	.	.	.072	.008 <T
MAY	.036	.018	.	.
JUN	.066	.028	.154	.022
JUL	.	.	.026	.022
NITRITE (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = 1.000 (A1)
JAN	.002 <T	.001 <T	.002 <T	.001 <T
FEB	.005	.001 <T	.002 <T	.001 <T
MAR	.002 <T	.001 <T	.002 <T	.001 <T
APR	.	.	.001 <T	.001 <T
MAY	.003 <T	.003 <T	.	.
JUN	.002 <T	.002 <T	.002 <T	.002 <T
JUL	.	.	.003 <T	.003 <T
TOTAL NITRATES (MG/L)		DET'N LIMIT = .020		GUIDELINE = 10.000 (A1)
JAN	.520	.215	.370	.220
FEB	.415	.250	.170	.125
MAR	.300	.275	.500	.275
APR	.	.	.345	.235

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
MAY	.370	.220	.	.
JUN	.210	.145	.345	.150
JUL	.	.	.130	.100
NITROGEN TOT KJELD (MG/L)		DET'N LIMIT = .020		GUIDELINE = N/A
JAN	.330	.090 <T	.250	.080 <T
FEB	.210	.080 <T	.230	.170
MAR	.120	.100	.270	.110
APR	.	.	.100	.180
MAY	.150	.120	.	.
JUN	.190	.140	.320	.140
JUL	.	.	.170	.150
PH (DMSNLESS)		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5(A4)
JAN	7.340	7.500	7.380	7.510
FEB	7.620	7.670	7.540	7.690
MAR	7.460	7.450	7.460	7.500
APR	.	.	7.530	7.690
MAY	7.710	7.740	.	.
JUN	7.530	7.610	7.580	7.620
JUL	.	.	7.580	7.860
SULPHATE (MG/L)		DET'N LIMIT = .200		GUIDELINE = 500. (A3)
JUL	.	.	29.200	30.100
TURBIDITY (FTU)		DET'N LIMIT = .02		GUIDELINE = 1.00 (A1)
JAN	.350	.230	.250	.130
FEB	.460	.250	.550	.320
MAR	.490	.330	.330	.160
APR	.	.	.230	.120
MAY	.900	.300	.	.
JUN	.930	.750	.440	.770
JUL	.	.	.290	.220

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
METALS				
SILVER (UG/L)		DET'N LIMIT = .020		GUIDELINE = 50. (A1)
JAN	.850	.027 <T	BDL	!!S
FEB	.250 <T	.030 <T	.040 <T	.020 <T
MAR	.220 <T	BDL	BDL	BDL
APR	.	.	BDL	.140 <T
MAY	.470 <T	BDL	.	.
JUN	.060 <T	BDL	BDL	BDL
JUL	.	.	.030 <T	BDL
ALUMINUM (UG/L)		DET'N LIMIT = .050		GUIDELINE = 100.(A4)
JAN	67.000	96.000	108.000	!!S
FEB	73.000	74.000	30.000	36.000
MAR	58.000	58.000	39.000	53.000
APR	.	.	16.000	23.000
MAY	64.000	40.000	.	.
JUN	31.000	33.000	33.000	67.000
JUL	.	.	46.000	45.000
ARSENIC (UG/L)		DET'N LIMIT = 0.050		GUIDELINE = 50.0 (A1)
JAN	.210 <T	.220 <T	.220 <T	!!S
FEB	.230 <T	.180 <T	.510 <T	.650 <T
MAR	.250 <T	.180 <T	.270 <T	.100 <T
APR	.	.	.210 <T	.240 <T
MAY	.230 <T	.340 <T	.	.
JUN	.530 <T	.480 <T	.380 <T	.650 <T
JUL	.	.	.250 <T	.220 <T
BARIUM (UG/L)		DET'N LIMIT = 0.020		GUIDELINE = 1000. (A1)
JAN	22.000	17.000	20.000	!!S
FEB	18.000	16.000	22.000	17.000
MAR	21.000	17.000	20.000	18.000
APR	.	.	22.000	18.000
MAY	19.000	19.000	.	.
JUN	20.000	19.000	24.000	21.000
JUL	.	.	21.000	19.000
BORON (UG/L)		DET'N LIMIT = 0.200		GUIDELINE = 5000. (A1)
JAN	6.200 <T	7.140 <T	9.700 <T	!!S
FEB	5.200 <T	4.900 <T	570.000	13.000 <T
MAR	5.300 <T	5.000 <T	18.000 <T	5.600 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
APR	.	.	17.000 <T	4.000 <T
MAY	1.900 <T	1.900 <T	.	.
JUN	4.300 <T	5.600 <T	5.300 <T	4.000 <T
JUL	.	.	6.300 <T	6.900 <T
BERYLLIUM (UG/L)		DET'N LIMIT = 0.010		GUIDELINE = .20 (H)
JAN	BDL	2.620	BDL	!!S
FEB	BDL	.010 <T	.100 <T	.010 <T
MAR	.010 <T	.020 <T	.010 <T	.010 <T
APR	.	.	.050 <T	.050 <T
MAY	BDL	BDL	.	.
JUN	BDL	BDL	BDL	BDL
JUL	.	.	BDL	BDL
CADMIUM (UG/L)		DET'N LIMIT = 0.050		GUIDELINE = 5.000 (A1)
JAN	.097 <T	BDL	.095 <T	!!S
FEB	.050 <T	BDL	.140 <T	.070 <T
MAR	.060 <T	BDL	.130 <T	.050 <T
APR	.	.	.100 <T	BDL
MAY	.120 <T	BDL	.	.
JUN	BDL	BDL	.080 <T	.100 <T
JUL	.	.	BDL	BDL
COBALT (UG/L)		DET'N LIMIT = 0.020		GUIDELINE = 1000 (H)
JAN	.200 <T	1.000	.140 <T	!!S
FEB	.240 <T	.320 <T	.580 <T	.470 <T
MAR	.490 <T	.500 <T	.380 <T	.390 <T
APR	.	.	.450 <T	.300 <T
MAY	.290 <T	.170 <T	.	.
JUN	.110 <T	.240 <T	.090 <T	.720 <T
JUL	.	.	.180 <T	.160 <T
CHROMIUM (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = 50. (A1)
JAN	.393 <T	.440 <T	.530 <T	!!S
FEB	.380 <T	.200 <T	.200 <T	.110 <T
MAR	.270 <T	.230 <T	.350 <T	.240 <T
APR	.	.	.650 <T	.340 <T
MAY	.230 <T	.210 <T	.	.
JUN	BDL	BDL	.190 <T	.190 <T
JUL	.	.	.830 <T	.770 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
COPPER (UG/L)			DET'N LIMIT = .100	GUIDELINE = 1000 (A3)
JAN	82.000	6.500	124.000	IIS
FEB	45.000	4.600	170.000	26.000
MAR	53.000	14.000	250.000	59.000
APR	.	.	190.000	36.000
MAY	28.000	6.000	.	.
JUN	33.000	8.800	86.000	26.000
JUL	.	.	30.000	9.500
IRON (UG/L)			DET'N LIMIT = 4.000	GUIDELINE = 300. (A3)
JAN	188.000	130.000	58.000	IIS
FEB	120.000	63.000	54.000	47.000
MAR	290.000	130.000	49.000	38.000 <T
APR	.	.	14.000 <T	48.000
MAY	400.000	230.000	.	.
JUN	390.000	230.000	40.000 <T	190.000
JUL	.	.	19.000 <T	25.000 <T
MERCURY (UG/L)			DET'N LIMIT = 0.010	GUIDELINE = 1.000 (A1)
JAN	.	.010	.	.020
FEB	.	BDL	.	.010
MAR	.	.010	.	.020
APR	.	.	.	.030
MAY	.	BDL	.	.
JUN	.	BDL	.	.040 <T
JUL	.	.	.	.040 <T
MANGANESE (UG/L)			DET'N LIMIT = .050	GUIDELINE = 50.0 (A3)
JAN	8.200	7.300	4.600	IIS
FEB	8.500	7.300	48.000	49.000
MAR	15.000	14.000	9.000	9.900
APR	.	.	7.000	7.400
MAY	16.000	11.000	.	.
JUN	13.000	10.000	6.700	37.000
JUL	.	.	4.000	3.900
MOLYBDENUM (UG/L)			DET'N LIMIT = 0.020	GUIDELINE = 500 (H)
JAN	.110 <T	.120 <T	.092 <T	IIS
FEB	.100 <T	.090 <T	.150 <T	.160 <T
MAR	.050 <T	.030 <T	.060 <T	.060 <T
APR	.	.	.130 <T	.080 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
MAY	.080 <T	.100 <T	.	.
JUN	.160 <T	.210 <T	.130 <T	.160 <T
JUL	.	.	.100 <T	.080 <T
NICKEL (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = 50. (F3)
JAN	16.000	8.700	8.600	!!S
FEB	12.000	11.000	83.000	59.000
MAR	39.000	25.000	23.000	23.000
APR	.	.	42.000	22.000
MAY	16.000	10.000	.	.
JUN	17.000	7.200	9.600	21.000
JUL	.	.	4.700	4.700
LEAD (UG/L)		DET'N LIMIT = 0.050		GUIDELINE = 50. (A1)
JAN	3.060	.210	4.700	!!S
FEB	3.400	.160 <T	6.900	.470
MAR	1.100	.180 <T	5.000	.640
APR	.	.	1.700	.630
MAY	.880	.210	.	.
JUN	.810	.230	3.500	.690
JUL	.	.	1.900	.390
ANTIMONY (UG/L)		DET'N LIMIT = .050		GUIDELINE = 146. (D4)
JAN	.084 <T	.052 <T	.076 <T	!!S
FEB	.080 <T	.050 <T	.110 <T	.090 <T
MAR	.090 <T	.050 <T	.080 <T	.050 <T
APR	.	.	.110 <T	.100 <T
MAY	.070 <T	.080 <T	.	.
JUN	.050 <T	BDL	.080 <T	.040 <T
JUL	.	.	.520	.600
SELENIUM (UG/L)		DET'N LIMIT = 0.200		GUIDELINE = 10. (A1)
JAN	.630 <T	.630 <T	.380 <T	!!S
FEB	BDL	.430 <T	.520 <T	.340 <T
MAR	BDL	.630 <T	.660 <T	BDL
APR	.	.	.440 <T	.920 <T
MAY	BDL	1.000 <T	.	.
JUN	.450 <T	.710 <T	.910 <T	BDL
JUL	.	.	BDL	BDL
STRONTIUM (UG/L)		DET'N LIMIT = .050		GUIDELINE = 2000.(H)

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
JAN	31.000	31.000	30.000	!!S
FEB	29.000	28.000	48.000	47.000
MAR	27.000	27.000	28.000	29.000
APR	.	.	30.000	27.000
MAY	29.000	28.000	.	.
JUN	29.000	26.000	27.000	28.000
JUL	.	.	29.000	26.000
TITANIUM (UG/L)		DET'N LIMIT = .050		GUIDELINE = N/A
JAN	5.500	5.500	5.300	!!S
FEB	5.400	5.500	11.000	4.000
MAR	8.800	8.800	9.400	8.500
APR	.	.	5.900	5.800
MAY	4.000	3.300	.	.
JUN	2.900	2.800	3.000	4.900
JUL	.	.	4.100	4.400
THALLIUM (UG/L)		DET'N LIMIT = .010		GUIDELINE = 13. (D4)
JAN	.031 <T	.069 <T	.039 <T	!!S
FEB	BDL	BDL	.010 <T	.020 <T
MAR	.010 <T	BDL	.010 <T	BDL
APR	.	.	BDL	BDL
MAY	BDL	BDL	.	.
JUN	BDL	BDL	BDL	BDL
JUL	.	.	BDL	BDL
URANIUM (UG/L)		DET'N LIMIT = .020		GUIDELINE = 20. (A2)
JAN	.048 <T	.063 <T	.044 <T	!!S
FEB	.020 <T	.020 <T	.040 <T	.030 <T
MAR	.020 <T	.040 <T	.030 <T	.020 <T
APR	.	.	.040 <T	.080 <T
MAY	BDL	BDL	.	.
JUN	BDL	BDL	BDL	BDL
JUL	.	.	.030 <T	BDL
VANADIUM (UG/L)		DET'N LIMIT = .050		GUIDELINE = 100 (H)
JAN	.260 <T	.440	.400	!!S
FEB	.320 <T	.330 <T	.270 <T	.190 <T
MAR	.280 <T	.270 <T	.290 <T	.250 <T
APR	.	.	.210 <T	.250 <T
MAY	.490 <T	.350 <T	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	.510	.460 <T	.430 <T	.740
JUL	.	.	.580	.710
ZINC (UG/L)		DET'N LIMIT = .001		GUIDELINE = 5.00 (A3)
JAN	8.500	2.300	8.100	IIS
FEB	7.000	2.400	22.000	4.200
MAR	9.400	4.100	20.000	5.100
APR	.	.	23.000	4.800
MAY	6.500	2.500	.	.
JUN	7.800	2.600	12.000	9.000
JUL	.	.	3.000	1.600

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
PESTICIDES & PCB				
ALPHA BHC (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 700 (G)
JAN	.	1.000 <T	.	2.000 <T
FEB	.	BDL	.	2.000 <T
MAR	.	4.000 <T	.	2.000 <T
APR	.	.	.	2.000 <T
MAY	.	BDL	.	.
JUN	.	1.000 <T	.	2.000 <T
JUL	.	.	.	3.000 <T
LINDANE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 4000 (A1)
JAN	.	BDL	.	BDL
FEB	.	BDL	.	BDL
MAR	.	1.000 <T	.	BDL
APR	.	.	.	BDL
MAY	.	BDL	.	.
JUN	.	BDL	.	BDL
JUL	.	.	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
VOLATILES				
BENZENE (UG/L)		DET'N LIMIT = .050		GUIDELINE = 5.0 (81)
MAR	.	BDL	.	BDL
APR	.	.	.	BDL
MAY	.	.050 <T	.	.
JUN	.	BDL	.	.100 <T
JUL	.	.	.	.150 <T
TOLUENE (UG/L)		DET'N LIMIT = .050		GUIDELINE = 24.0 (84)
MAR	.	BDL	.	BDL
APR	.	.	.	BDL
MAY	.	.150 UCS	.	.
JUN	.	.150 <T	.	.050 <T
JUL	.	.	.	.250 <T
ETHYLBENZENE (UG/L)		DET'N LIMIT = .050		GUIDELINE = 2.4 (84)
MAR	.	BDL	.	BDL
APR	.	.	.	BDL
MAY	.	.050 <T	.	.
JUN	.	BDL	.	BDL
JUL	.	.	.	.100 <T
M-XYLENE (UG/L)		DET'N LIMIT = .100		GUIDELINE = 300 (84)
MAR	.	BDL	.	BDL
APR	.	.	.	BDL
MAY	.	.100 <T	.	.
JUN	.	BDL	.	BDL
JUL	.	.	.	BDL
O-XYLENE (UG/L)		DET'N LIMIT = .050		GUIDELINE = 300 (84)
MAR	.	BDL	.	BDL
APR	.	.	.	BDL
MAY	.	.050 <T	.	.
JUN	.	BDL	.	BDL
JUL	.	.	.	BDL
CHLOROFORM (UG/L)		DET'N LIMIT = .100		GUIDELINE = 350 (A1+)
MAR	.	!TX	.	!TX
APR	.	.	.	26.600
MAY	.	25.900	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI WSS) 1988

	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM
	SITE 1		SITE 2	
	STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	.	41.700	.	42.700
JUL	.	.	.	95.000
DICHLOROBROMOMETHANE (UG/L)		DET'N LIMIT = .050		GUIDELINE = 350 (A1+)
MAR	.	ITX	.	ITX
APR	.	.	.	1.000
MAY	.	.950	.	.
JUN	.	1.100	.	1.150
JUL	.	.	.	1.750
TOTL TRIHALOMETHANES (UG/L)		DET'N LIMIT = .500		GUIDELINE = 350 (A1)
MAR	.	ITX	.	ITX
APR	.	.	.	27.600
MAY	.	26.850	.	.
JUN	.	42.800	.	43.800
JUL	.	.	.	96.750

Table VI

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
STANDARD PLATE COUNT MEMBRANE FILTRATION	CT/ML	0	500/ML(A1)
P/A BOTTLE		0	0 (A1*)
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100mL(A1)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
CHLOROAROMATICS			
HEXACHLOROBUTADIENE	NG/L	1.000	450. (D4)
1,2,3-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,4-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.000	38000 (D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.000	10000 (D4)
HEXACHLOROBENZENE	NG/L	1.0	10. (C1)
HEXACHLOROETHANE	NG/L	1.000	1900. (D4)
OCTACHLOROSTYRENE	NG/L	1.000	N/A
PENTACHLOROBENZENE	NG/L	1.000	74000 (D4)
2,3,6-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,4,5-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,6,A-TRICHLOROTOLUENE	NG/L	5.000	N/A
CHLOROPHENOLS			
2,3,4-TRICHLOROPHENOL	NG/L	50.	N/A
2,3,4,5-TETRACHLOROPHENOL	NG/L	50.	N/A
2,3,5,6-TETRACHLOROPHENOL	NG/L	50.	N/A
2,4,5-TRICHLOROPHENOL	NG/L	50.	2600000 (D4)
2,4,6-TRICHLOROPHENOL	NG/L	50.	5000. (B1)
PENTACHLOROPHENOL	NG/L	50.	60000. (B1)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD PH	DIMENSLESS	N/A	6.5-8.5(A4)
FIELD TEMPERATURE	°C	N/A	<15 °C(A1)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	.200	30-500(A4)
CALCIUM	MG/L	.100	100. (F2)
CYANIDE	MG/L	.001	.20(A1)
CHLORIDE	MG/L	.200	250. (A3)
COLOUR	TCU	.5	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.	400. (F2)
FLUORIDE	MG/L	.01	2.4 (A1)
HARDNESS	MG/L	.50	80-100(A4)
MAGNESIUM	MG/L	.05	30. (F2)
SODIUM	MG/L	.20	200. (C3)
AMMONIUM TOTAL	MG/L	.002	.05(F2)
NITRITE	MG/L	.001	1.0 (A1)
TOTAL NITRATES	MG/L	.02	10. (A1)
NITROGEN TOTAL KJELDAHL	MG/L	.02	N/A
PH	DIMENSLESS	N/A	6.5-8.5(A4)
PHOSPHORUS FIL REACT	MG/L	.0005	N/A
PHOSPHORUS TOTAL	MG/L	.002	.40(F2)
TOTAL SOLIDS	MG/L	1.	500. (A3)
TURBIDITY	FTU	.02	1.0 (A1)
METALS			

BORON	UG/L	.200	5000.	(A1)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
BERYLLIUM	UG/L	.010	0.20	(H)
CADMIUM	UG/L	.050	5.0	(A1)
COBALT	UG/L	.020	1000.	(H)
CHROMIUM	UG/L	.100	50.	(A1)
COPPER	UG/L	.100	1000.	(A3)
IRON	UG/L	4.0	300.	(A3)
MERCURY	UG/L	.01	1.0	(A1)
MANGANESE	UG/L	.050	50.	(A3)
MOLYBDENUM	UG/L	.020	500.	(H)
NICKEL	UG/L	.100	50.	(F3)
LEAD	UG/L	.050	50.	(A1)
SELENIUM	UG/L	.200	10.	(A1)
SILVER	UG/L	.020	50.	(A1)
STRONTIUM	UG/L	.050	2000.	(H)
THALLIUM	UG/L	.010	13.	(D4)
TITANIUM	UG/L	.050	N/A	
URANIUM	UG/L	.020	20.	(A2)
VANADIUM	UG/L	.050	100.	(H)
ZINC	UG/L	.020	500.	(A3)

PHENOLICS

PHENOLICS (UNFILTERED REACTIVE)	UG/L	.2	2.0	(A3)

PESTICIDES & PCB

ALDRIN	NG/L	1.0	700.	(A1)
AMETRINE	NG/L	50.	300000.	(D3)
ATRAZINE	NG/L	50.	60000.	(B3)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700.	(G)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300.	(G)
GAMMA HEXACHLOROCYCLOHEXANE(LINDANE)	NG/L	1.0	4000.	(A1)
ALPHA CHLORDANE	NG/L	2.0	7000.	(A1)
GAMMA CHLORDANE	NG/L	2.0	7000.	(A1)
BLADEX	NG/L	100.	10000.	(B3)
DIELDRIN	NG/L	2.0	700.	(A1)
METHOXYCHLOR	NG/L	5.0	100000.	(A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000.	(D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	4.0	74000.	(D4)
ENDRIN	NG/L	4.0	200.	(A1)
ENDOSULFAN SULPHATE(THIODAN SULPHATE)	NG/L	4.0	N/A	
HEPTACHLOR EPOXIDE	NG/L	1.0	3000.	(A1)
HEPTACHLOR	NG/L	1.0	3000.	(A1)
METOLACHLOR	NG/L	500.	50000.	(B3)
MIREX	NG/L	5.0	N/A	
OXYCHLORDANE	NG/L	2.0	N/A	
O,P-DDT	NG/L	5.0	30000.	(A1)
PCB	NG/L	20.0	3000.	(A2)
O,P-DDD	NG/L	5.0	N/A	
PPDDE	NG/L	1.0	30000.	(A1)
PPDDT	NG/L	5.0	30000.	(A1)
ATRATONE	NG/L	50.	N/A	
ALACHLOR	NG/L	500.	35000.	(D2)
PROMETONE	NG/L	50.	52500.	(D3)
PROPAZINE	NG/L	50.	16000.	(D2)
PROMETRYNE	NG/L	50.	1000.	(B3)
SENCOR (METRIBUZIN)	NG/L	100.	80000.	(B2)
SIMAZINE	NG/L	50.	10000.	(B3)

POLYAROMATIC HYDROCARBONS

PHENANTHRENE	NG/L	10.0	N/A	
ANTHRACENE	NG/L	1.0	N/A	
FLUORANTHENE	NG/L	20.0	42000.	(D4)
PYRENE	NG/L	20.0	N/A	
BENZO(A)ANTHRACENE	NG/L	20.0	N/A	
CHRYSENE	NG/L	50.0	N/A	
DIMETHYL BENZO(A)ANTHRACENE	NG/L	5.0	N/A	
BENZO(E)PYRENE	NG/L	50.0	N/A	
BENZO(B)FLUORANTHENE	NG/L	10.0	N/A	
PERYLENE	NG/L	10.0	N/A	
BENZO(K)FLUORANTHENE	NG/L	1.0	N/A	
BENZO(A)PYRENE	NG/L	5.0	10.	(B1)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
BENZO(G,H,I)PERYLENE	NG/L	20.0	N/A	
DIBENZO(A,H)ANTHRACENE	NG/L	10.0	N/A	
INDENO(1,2,3-C,D)PYRENE	NG/L	20.0	N/A	
BENZO(B)CHRYSENE	NG/L	2.0	N/A	
CORONENE	NG/L	10.0	N/A	
SPECIFIC PESTICIDES				
TOXAPHENE	NG/L	N/A	5000.	(A1)
2,4,5-TRICHLOROBUTYRIC ACID (2,4,5-T)	NG/L	50.	280000.	(B1)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.	100000.	(A1)
2,4-DICHLORORPHENOXYBUTYRIC ACID	NG/L	200.	18000.	(B3)
2,4-D PROPIONIC ACID	NG/L	100.	N/A	
DICAMBA	NG/L	100.	87000.	(B3)
PICHLORAN	NG/L	100.	2450000.	(D3)
SILVEX (2,4,5-TP)	NG/L	50.	10000.	(A1)
DIAZINON	NG/L	20.	14000.	(A1)
DICHLOROVOS	NG/L	20.	N/A	
DURSBAN	NG/L	20.	N/A	
ETHION	NG/L	20.	35000.	(G)
GUTHION	NG/L	N/A	N/A	
MALATHION	NG/L	20.	160000.	(G)
MEVINPHOS	NG/L	20.	N/A	
METHYL PARATHION	NG/L	50.	7000.	(B3)
METHYLTRITHION	NG/L	20.	N/A	
PARATHION	NG/L	20.	35000.	(B1)
PHORATE (THIMET)	NG/L	20.	35.	(D2)
RELDAN	NG/L	20.	N/A	
RONNEL	NG/L	20.	N/A	
AMINOCARB	NG/L	N/A	N/A	
BENOMYL	NG/L	N/A	N/A	
BUX (METALKAMATE)	NG/L	2000.	N/A	
CARBOFURAN	NG/L	2000.	18000.	(D3)
CICP (CHLORPROPHAM)	NG/L	2000.	350000.	(G)
DIALLATE	NG/L	2000.	30000.	(H)
EPTAM	NG/L	2000.	N/A	
IPC	NG/L	2000.	N/A	
PROPOXUR (BAYGON)	NG/L	2000.	90000.	(G)
SEVIN (CARBARYL)	NG/L	200.	70000.	(A1)
SUTAN (BUTYLATE)	NG/L	2000.	245000.	(D3)
VOLATILES				
BENZENE	UG/L	.050	5.0	(B1)
TOLUENE	UG/L	.050	24.0	(B4)
ETHYLBENZENE	UG/L	.050	2.4	(B4)
PARA-XYLENE	UG/L	.100	300.	(B4)
META-XYLENE	UG/L	.100	300.	(B4)
ORTHO-XYLENE	UG/L	.050	300.	(B4)
1,1-DICHLOROETHYLENE	UG/L	.100	7.0	(D1)
ETHLYENE DIBROMIDE	UG/L	.05	50.	(G)
METHYLENE CHLORIDE	UG/L	.500	1750.	(D3)
TRANS-1,2-DICHLOROETHYLENE	UG/L	.100	350.	(D3)
1,1-DICHLOROETHANE	UG/L	.100	N/A	
CHLOROFORM	UG/L	.100	350.	(A1+)
1,1,1-TRICHLOROETHANE	UG/L	.020	200.	(D1)
1,2-DICHLOROETHANE	UG/L	.050	5.0	(D1)
CARBON TETRACHLORIDE	UG/L	.200	5.0	(D1)
1,2-DICHLOROPROPANE	UG/L	.050	10.0	(G)
TRICHLOROETHYLENE	UG/L	.100	5.0	(D1)
DICHLOROBROMOMETHANE	UG/L	.050	350.	(A1+)
1,1,2-TRICHLOROETHANE	UG/L	.050	.60	(D4)
CHLORODIBROMOMETHANE	UG/L	.100	350.	(A1+)
TETRACHLOROETHYLENE	UG/L	.050	10.0	(C2)
BROMOFORM	UG/L	.200	350.	(A1+)
1,1,2,2-TETRACHLOROETHANE	UG/L	.050	0.17	(D4)
CHLOROBENZENE	UG/L	.100	1510.	(D3)
1,4-DICHLOROBENZENE	UG/L	.100	5.0	(B1)
1,3-DICHLOROBENZENE	UG/L	.100	130.	(G)
1,2-DICHLOROBENZENE	UG/L	.050	200.	(B1)
TRIFLUOROCHLOROTOLUENE	UG/L	.100	N/A	
TOTAL TRIHALOMETHANES	UG/L	.500	350.	(A1)
STYRENE	UG/L	.05	46.5	(D2)